TWISTER

Baukasten / kit **# 21 4222**

MULTIPLEX®

D	*Bauanleitung*	*3 ... 6*
F	*Notice de construction*	*7 ... 10*
GB	*Building instructions*	*11 ... 20*
I	*Instruzioni di montaggio*	*21 ... 25*
E	*Instrucciones de montaje*	*26 ... 29*

Ersatzteile / Replacement parts **30**

© Copyright by MULTIPLEX 2007 Vers. 1.2

D Sicherheitshinweise

Prüfen Sie vor jedem Start den festen Sitz des Motors und der Luftschraube - insbesondere nach dem Transport, härteren Landungen sowie Abstürzen. Prüfen Sie ebenfalls vor jedem Start den festen Sitz und die richtige Position der Tragflächen auf dem Rumpf.

Akku erst einstecken, wenn Ihr Sender eingeschaltet ist und Sie sicher sind, daß das Bedienelement für die Motorsteuerung auf "AUS" steht.

Im startbereiten Zustand nicht in den Bereich der Luftschraube greifen.
Vorsicht in der Luftschraubendrehebene - auch Zuschauer zur Seite bitten!

Zwischen den Flügen die Motortemperatur durch vorsichtige Fingerprobe prüfen und
vor einem Neustart den Motor ausreichend abkühlen lassen. Die Temperatur ist richtig, wenn Sie den Motor problemlos berühren können. Insbesondere bei hohen Außentemperaturen kann dieses bis zu 15 Minuten dauern.

Denken Sie immer daran: Niemals auf Personen und Tiere zufliegen.

F Conseils de sécurité

Avant chaque décollage, vérifiez la fixation du moteur et de l'hélice, notamment après le transport, après les atterrissages violents et après un “Crash”. Vérifiez également, avant chaque décollage la fixation ainsi que le positionnement de l’aile par rapport au fuselage.

Ne branchez l’accu de propulsion que si vous êtes sûr que votre émetteur est allumé et que l’élément de commande moteur est en position “ARRET”.

Ne mettez pas vos doigts dans l’hélice! Attention à la mise en marche, demandez également aux spectateurs de reculer.

Entre deux vols, vérifiez en posant un doigt dessus, la température du moteur, laissezle refroidir suffisamment avant le prochain décollage. La température est correcte si vous pouvez maintenir votre doigt ou votre main sur le moteur. Le temps de refroidissement peut varier jusqu’à 15 minutes s’il fait particulièrement chaud.

Pensez-y toujours: ne volez jamais vers ou au-dessus des personnes ou des animaux.

GB Safety notes

Before every flight check that the motor and propeller are in place and secure - especially after transporting the model, and after hard landings and crashes. Check also that the wing is correctly located and firmly secured on the fuselage before each flight.

Don’t plug in the battery until you have switched on the transmitter, and you are sure that the motor control on the transmitter is set to “OFF”.

When the model is switched on, ready to fly, take care not to touch the propeller. Keep well clear of the propeller disc too, and ask spectators to stay back.

Allow the motor to cool down after each flight. You can check this by carefully touching the motor case with your finger. The temperature is correct when you can hold your finger on the case without any problem. On hot days this may take up to 15 minutes.

Please keep in mind at all times: don’t fly towards people or animals.

I Note di sicurezza

Prima di ogni decollo controllare che il motore e la eliche siano fissati stabilmente - specialmente dopo il trasporto, atterraggi duri e se il modello è precipitato. Controllare prima del decollo anche il fissaggio e la posizione corretta delle ali sulla fusoliera.

Collegare la batteria solo quando la radio è inserita ed il comando del motore è sicuramente in posizione ”SPENTO”.

Prima del decollo non avvicinarsi al campo di rotazione della eliche. Attenzione alla eliche in movimento - pregare che eventuali spettatori si portino alla dovuta distanza di sicurezza!

Tra un volo e l’altro controllare cautamente con le dita la temperatura del motore e farli raffreddare sufficientemente prima di ogni nuovo decollo. La temperatura è giusta se si possono toccare senza problemi. Specialmente con una temperatura esterna alta questo può durare fino a 15 minuti.

Fare attenzione: Non volare mai nella direzione di persone ed animali.

E Advertencias de seguridad

Compruebe antes de cada despegue que el motor y la hélice estén fuertemente sujetados, sobretodo después de haberlo transportado, de aterrizajes más fuertes así como después de una caída. Compruebe igualmente antes de cada despegue que las alas estén bien sujetas y bien colocadas en el fuselaje.

Conectar la batería, cuando la emisora esté encendida y Usted esté seguro que el elemento de mando para el motor esté en ”OFF”.

No meter la mano en la zona inmediata a la hélice cuando el avión esté a punto de despegar. ¡Cuidado con la zona de la hélice! ¡Pedir a los espectadores que se aparten!

Entre los vuelos hay que comprobar cuidadosamente la temperatura del motor con el dedo y dejar que el motor se enfríe antes de volver a despegar. La temperatura es correcta, si puede tocar el motor sin problemas. Sobretodo en el caso de temperaturas del ambiente muy altas, esto puede tardar unos 15 minutos.

Recuerde: No volar nunca hacía personas o animales.

Examine your kit carefully!
MULTIPLEX model kits are subject to constant quality checks throughout the production process, and we sincerely hope that you are completely satisfied with the contents of your kit. However, we would ask you to check all the parts (referring to the Parts List) **before** you start construction, as **we cannot exchange components which you have already worked on**. If you find any part is not acceptable for any reason, please take the kit back to your model shop in the first instance, as he will be able to advise you. After checking, he will send the component or the kit to our Quality Control department. We can only process guarantee claims if the purchase receipt and a brief description of the fault are supplied.
We are constantly working on improving our models, and for this reason we must reserve the right to change the kit contents in terms of shape or dimensions of parts, technology, materials and fittings, without prior notification. Please understand that we cannot entertain claims against us if the kit contents do not agree in every respect with the instructions and the illustrations.

Caution!
Radio-controlled models, and especially model aircraft, are by no means playthings. Building and operating them safely requires a certain level of technical competence and manual skill, together with discipline and a responsible attitude at the flying field. Errors and carelessness in building and flying the model can result in serious personal injury and damage to property. Since we, as manufacturers, have no control over the construction, maintenance and operation of our products, we are obliged to take this opportunity to point out these hazards and to emphasise your personal responsibility.

Additional items required:

e.g. MULTIPLEX *Micro IPD* receiver	35 MHz, A-band	Order No. **5 5971**
alternatively	40 MHz	Order No. **5 5972**
or MULTIPLEX *RX-7 SYNTH DS IPD* receiver	35 MHz, A-band	Order No. **5 5885**
MULTIPLEX *Nano-S* servo	*2 x required for ailerons*	Order No. **6 5120**
	1 x required for elevator	
Servo extension lead	*3 x 30 cm required for aileron*	
	servos and speed controller	Order No. **8 5031**
	1 x 60 cm required for elevator servo	Order No. **8 5032**
CC PHOENIX 45 speed controller		Order No. **28 9010**
3.5 mm gold-contact socket	3 required	Order No.**8 5211**

Flight battery (minimum load capacity approx. 36 A):

MULTIPLEX flight pack, e.g. LiBatt 3/1-2500 mAh (load capacity approx. 45 A)	Order No. **15 7191**
or MULTIPLEX flight pack, e.g. LiBatt 3/1-3200 mAh (load capacity approx. 64 A)	Order No. **15 7136**

Adhesive: cyano-acrylate
Use medium and high-viscosity cyano-acrylate glue (”cyano” - not styrofoam cyano) for this model. Epoxy adhesives produce what initially appears to be a sound joint, but the bond is only superficial, and the hard resin breaks away from the parts under load. Hot-melt glue (from a glue gun) is an excellent alternative adhesive, especially for servo mounting.

Tools:
Scissors, balsa knife, combination pliers, long pointed-nose pliers, slot-head / cross-point screwdrivers (for the servo output arm screws).

Specification:

Wingspan	850 mm
Overall fuselage length	1170 mm
All-up weight, min.	880 - 1100 g
Wing area	26 dm²
Wing loading (FAI)	min. 34 g / dm²
RC functions	Elevator, ailerons and throttle

Important note

This model is not made of styrofoam™, and it is not possible to glue the material using white glue or epoxy. Please be sure to use cyano-acrylate glue exclusively, preferably in conjunction with cyano activator (”kicker”). We recommend medium or high-viscosity (thick) cyano. This is the procedure with Elapor®: spray cyano activator on one face of the joint; allow it to air-dry for around two minutes until the surface appears to be ”dry”, then apply cyano adhesive to the other face. Join the parts, and immediately position them accurately.

Please take care when handling cyano-acrylate adhesives. These materials harden in seconds, so don’t get them on your fingers or other parts of the body.
We strongly recommend the use of goggles to protect your eyes.
Keep the adhesive out of the reach of children!

1. Before assembling the model:
Please check the contents of your kit before you start construction. You will find **Figs. 01 + 02** and the Parts List helpful here.

2. Right / left fuselage shells
The moulding process leaves bridging lugs at the front of the fuselage shells **4 + 5**, which should now be removed using a sharp balsa knife.
Fig. 03
Examine the air intakes, and remove any rough edges from the lips using a very sharp knife. If this leaves areas of a different colour, touch them in with a soft pencil.

Right-hand fuselage shell
3. Gluing the nose section to the fuselage shell
Trial-fit the fuselage nose **8** and the right-hand fuselage shell **5**, then glue the parts together using cyano. Take care to line the parts up accurately.
Fig. 04

4. Installing the fuselage stiffener
Glue the GRP rod **41** in the fuselage shell using cyano. Glue the rod over its full length, but don't apply so much cyano that it is forced out of the joint.
Fig. 05

5. Glue **the canopy latch catch 22** in the fuselage nose section **8**.
Fig. 06

6. Installing the elevator servo
The elevator servo can be glued in its recess using two drops of cyano or hot-melt glue. Be sparing with the adhesive, otherwise it may be difficult to remove the servo again if it should require repair at any time. Too much adhesive can also penetrate the servo case, with the danger of jamming the gearbox.
Deploy the servo lead in the channel provided. If you are using an extension lead with a plug-in connection, cut a small recess in the fuselage for the connectors. If you have soldering facilities, it is always preferable to solder the connections.
The lead crosses over the slot for the impeller support.

Secure the loose cable with adhesive tape so that it does not get in the way during the following procedures.
Fig. 07

7. Trim ballast
If you use the recommended components, you will need to glue the two ballast weights **34** in the space provided at the tail end of the fuselage. If lighter batteries become available in the future, you may be able to take the weights out again; you can remove one ball for each 20 g saved at the battery compartment position.
Fig. 08

8. Aileron servo lead
Glue the extension lead to the inside of the fuselage, with the socket flush with the outside surface, so that the aileron servo lead can be plugged in later when the wings are fitted.
Use a sharp knife to cut a small void opposite the socket to provide space for the servo plug. Unfortunately this void cannot be produced during the manufacturing process for technical reasons.
Fig. 09

Left-hand fuselage shell
9. Gluing the nose section to the fuselage shell
Trial-fit the fuselage nose **7** and the right-hand fuselage shell **4**, then glue the parts together using cyano. Take care to line the parts up accurately.
Fig. 10

10. Installing the fuselage stiffener
Glue the GRP rod **41** in the fuselage shell using cyano. Glue the rod over its full length, but don't apply so much cyano that it is forced out of the joint.
Fig. 11

Glue the stiffener **41** to the inside of the fuselage in the same manner.
Fig. 12

11. Glue **the canopy latch catch 22** in the fuselage nose section **7**.
Fig. 13

12. Glue the **extension lead** to the inside of the fuselage, with the socket flush with the outside surface, so that the aileron servo lead can be plugged in later when the wings are fitted.
Use a sharp knife to cut a small void opposite the socket to provide space for the servo plug. Unfortunately this void cannot be produced during the manufacturing process for technical reasons.
Fig. 14

13. Joining the fuselage shells
Start by trial-fitting the fuselage shells "dry" (no glue); they should fit together snugly, without requiring force and without being under tension. If there is a tight spot at any point, trim the parts where necessary before gluing the shells together using thick cyano. You will have a few minutes to get everything right, so work swiftly but not hurriedly. Join the fuselage shells, immediately line them up correctly, and hold the parts together until the glue starts to set. Do not resume work on the fuselage for a few minutes as the adhesive takes some time to cure properly.
Fig. 15

14. Aileron horns (both ailerons)
The aileron horns **24** are prepared and installed as shown in the illustration: 1 x left + 1 x right. Tighten the nuts **27** only lightly, as the swivel pushrod connectors **25** must turn smoothly. Secure the nuts with a tiny drop of paint or glue.
Caution: only apply the paint or glue to the outside of the nut and the stub of the thread.
Glue the horns in the aileron recesses.
Fig. 16

15. Installing the servos and pushrods (both ailerons)
Check from the transmitter that the aileron servos work correctly, and set them to centre. Fit the output levers on the servo shafts, ensuring that the arms project out of the wings (see illustration). Fit the servo arm retaining screws. Fix the servos in their recesses with a few drops of cyano or hot-melt glue. Connect the aileron pushrods **30** and adjust them.
Fig. 17

16. Freeing the ailerons (both ailerons)
Carefully release the ailerons by cutting along the marked lines; the slots should be about 1 mm wide. You will need a very sharp knife to cut the foam cleanly.
Fig. 18

17. Gluing the wing panels 10 + 11 to the fuselage, connecting the aileron servos
First connect the aileron servo leads (in the wings) to the extension leads which you have already installed in the fuselage. Leave the leads loose in the channels. Glue the wings to the fuselage, taking care not to glue the cables. Align the wings carefully before allowing the glue to cure.
Fig. 19

18. Installing the wing spar
Slide the wing spar under the servo leads and through the fuselage, then glue it in place along its full length.
Fig. 20

19. Servo leads and servo fairings
Deploy the servo leads in the channels in the wings, starting from the servo end. You may need to use the blunt side of a knife to push them into the slot. The excess length of the servo leads can be stowed in the space below the wing root. Trim the servo fairings **33** to fit, and glue them in place at the corners using cyano.
Fig. 21

20. Freeing the elevator from the tailplane
Carefully release the elevator by cutting along the marked lines; the slots should be about 1 mm wide.
Fig. 22

21. Gluing the horn in the elevator
The elevator horn **24** is prepared and fitted as shown in the illustration. Tighten the nut **27** only lightly, as the swivel pushrod connector **25** must turn smoothly. Secure the nut with a tiny drop of paint or glue.
Caution: only apply the paint or glue to the outside of the nut and the stub of the thread. Glue the horn in the elevator recess.
Fig. 23

22. Installing the tailplane
Trial-fit the tailplane **12** "dry" (no glue), and position it accurately. Carry out any minor trimming required, then glue the tailplane in place using cyano, and check its position and alignment again. Hold or pin the panel in position until the glue has set hard.
Connect the pushrod **31** and set it to the correct length using the swivel pushrod connector **25**.
Fig. 24

23. Fin
Trim the fin **13** to fit, and glue it in place. Check that it is exactly at right-angles to the tailplane before the glue sets.
Fig. 25

24. Canopy
Glue the latch tongues **23** in the canopy **9** over their full area, but take care to fit them projecting by the correct amount - not higher or lower.
Fig. 26

25. Installing the power unit
The ducted fan (impeller) unit is supplied in the kit ready to install, with a fully balanced rotor. Do not dismantle the assembly unless there is a real need to do so - after re-assembly the motor might be unbalanced, which would lead to a loss of performance.
Fig. 27

Connect the ducted fan **50** to the speed controller, and install the fan in the fan hatch **6.** Fix the ducted fan unit in place with a few drops of cyano applied to the edges, or use double-sided adhesive tape.

Carry out a test-run, and reverse the motor's direction of rotation if necessary.
Deploy all cables neatly. The channel for the leads between the hatch and the impeller should be sealed with a piece of foam. Introduce the impeller and the hatch into the main duct; a recess is provided for the speed controller in the intake duct forward of the ducted fan unit, where it is cooled without causing major disturbance to the airflow. Note that the cables run along the **outside** of the fuselage in the appropriate channel, which is then sealed with adhesive tape. Apply adhesive tape all round the ducted fan hatch to produce an air-tight seal.
Fig. 28

26. Receiving system and power system fittings
1. The ducted fan unit is already in place.
2. Mount the speed controller on the maintenance hatch forward of the impeller unit.
3. Fit the LiPo battery (2100, 2500 or 3200 mAh) in the battery compartment in the nose of the fuselage, adjust its position to obtain the correct Centre of Gravity, then secure it with Velcro tape.
4. The receiver and cables are also held in place with Velcro tape **20 + 21**, which is supplied in the kit.

27. Centre of Gravity
The CG should be borne in mind when you are installing the RC system components, to avoid the need for ballast as far as possible.
The CG should be within the range **100** to **110 mm** aft of the wing root leading edge, measured where the wings meet the fuselage. The moulded-in dimples on the underside of the wing indicate the correct balance point.
Fig. 30

28. Model settings (guideline only)**:**
CG:100 - 110 mm
Longitudinal dihedral:approx. +1° (non-variable)

29. Control surface travels:
Measured at the widest point of the control surfaces

Ailerons:	10 to 15 mm +/-
Elevator:	10 mm +/-

Exponential: ailerons 30%, elevator 15%

30. Test-flying:
Centre of Gravity
Start by balancing the model within the stated range. Once you have test-flown the model, you can fine-tune the setting as follows: fly straight and level at half-throttle, and roll the model inverted. If you now have to apply a great deal of "down" to hold level flight, the model is nose-heavy; the CG must be shifted further aft. If the machine climbs whilst inverted, without requiring elevator correction, the CG is too far aft. When balanced correctly, the model will require slight down-elevator for level inverted flight.

31. Aileron differential
Fly three or four rolls to the right at half-throttle; if the Twister veers to the right during this manoeuvre, you need to increase the aileron differential. If it veers to the left, i.e. against the direction of rolling, you should reduce the aileron differential.

32. Gilding the lily - applying the decals
The kit is supplied with a multi-colour decal sheet, part **2 + 3**. Cut out the individual name placards and emblems and apply them to the model in the positions shown in the kit box illustration, or in another arrangement which you find pleasing. We suggest that you blacken the canopy and the jet nozzle with a waterproof felt-tip pen, e.g. EDDING 3000.

33. Safety
Safety is the First Commandment when flying any model aircraft. Third party insurance should be considered a basic essential. If you join a model club suitable cover will usually be available through the organisation. It is your personal responsibility to ensure that your insurance is adequate for the type of model (powered model aircraft).

Make it your job to keep your models and your radio control system in perfect order at all times. Check the correct charging procedure for the batteries used in your RC set. Make use of all sensible safety measures and precautions which are advised for your system. An excellent source of practical accessories is the MULTIPLEX main catalogue, as our products are designed and manufactured exclusively by practising modellers for other practising modellers.
Always fly with a responsible attitude. You may think that flying low over other people's heads is proof of your piloting skill; others know better. The real expert does not need to prove himself in such childish ways. Let other pilots know that this is what you think too. Always fly in such a way that you do not endanger yourself or others. Bear in mind that even the best RC system in the world is subject to outside interference. No matter how many years of accident-free flying you have under your belt, you have no idea what will happen in the next minute.
We - the MULTIPLEX team - wish you many hours of pleasure in building and flying your new model. Happy landings!

MULTIPLEX Modellsport GmbH & Co. KG
Model Development Dept.

Klaus Michler

Twister KIT

Part No.	No. off	Description	Material	Dimensions
1	1	KIT building instructions	Paper, 80 g / m²	A4
2	1	Decal sheet, sheet 1	Printed self-adhesive film	700 x 330 mm
3	1	Decal sheet, sheet 1, registration markings	Printed self-adhesive film	500 x 350 mm
4	1	L.H. fuselage shell	Moulded Elapor foam	Ready made
5	1	R.H. fuselage shell	Moulded Elapor foam	Ready made
6	1	Ducted fan hatch	Moulded Elapor foam	Ready made
7	1	L.H. fuselage nose section	Moulded Elapor foam	Ready made
8	1	R.H. fuselage nose section	Moulded Elapor foam	Ready made
9	1	Canopy	Moulded Elapor foam	Ready made
10	1	L.H. wing	Moulded Elapor foam	Ready made
11	1	R.H. wing	Moulded Elapor foam	Ready made
12	1	Tailplane	Moulded Elapor foam	Ready made
13	1	Fin	Moulded Elapor foam	Ready made
Small parts set				
20	3	Velcro tape, hook	Plastic	25 x 60 mm
21	3	Velcro tap, loop	Plastic	25 x 60 mm
22	2	Latch catch	Injection-moulded plastic	Ready made
23	2	Latch tongue	Injection-moulded plastic	Ready made
24	4	Glue-fitting control surface horn	Injection-moulded plastic	Ready made
25	4	Swivel pushrod connector	Metal	Ready made, 6 mm Ø
26	4	Washer	Metal	M2
27	4	Nut	Metal	M2
28	4	Socket-head grubscrew	Metal	M3 x 3 mm
29	1	Allen key	Metal	1.5 mm A/F
30	2	Aileron pushrod, one Z-bend	Metal	1 Ø x 80 mm
31	1	Elevator pushrod, one Z-bend	Metal	1 Ø x 110 mm
32	1	L.H. servo fairing	Vacuum-moulded plastic	Ready made
33	1	R.H. servo fairing	Vacuum-moulded plastic	Ready made
34	2	Ballast weight	Steel ball, 9 g	13 mm Ø
Wire and tube set				
40	1	Tubular spar	GRP tube	8 Ø x 700 mm
41	3	Fuselage stiffener	GRP rod	1.3 Ø x 250 mm
Ducted fan power set				
50	1	DF69 RTR ducted fan with Himax A 2825-3600	Assembled and balanced	Ready made

TWISTER

TWISTER
73-21
MULTIPLEX

TWISTER
73-21
MULTIPLEX

TWISTER
73-21
MULTIPLEX

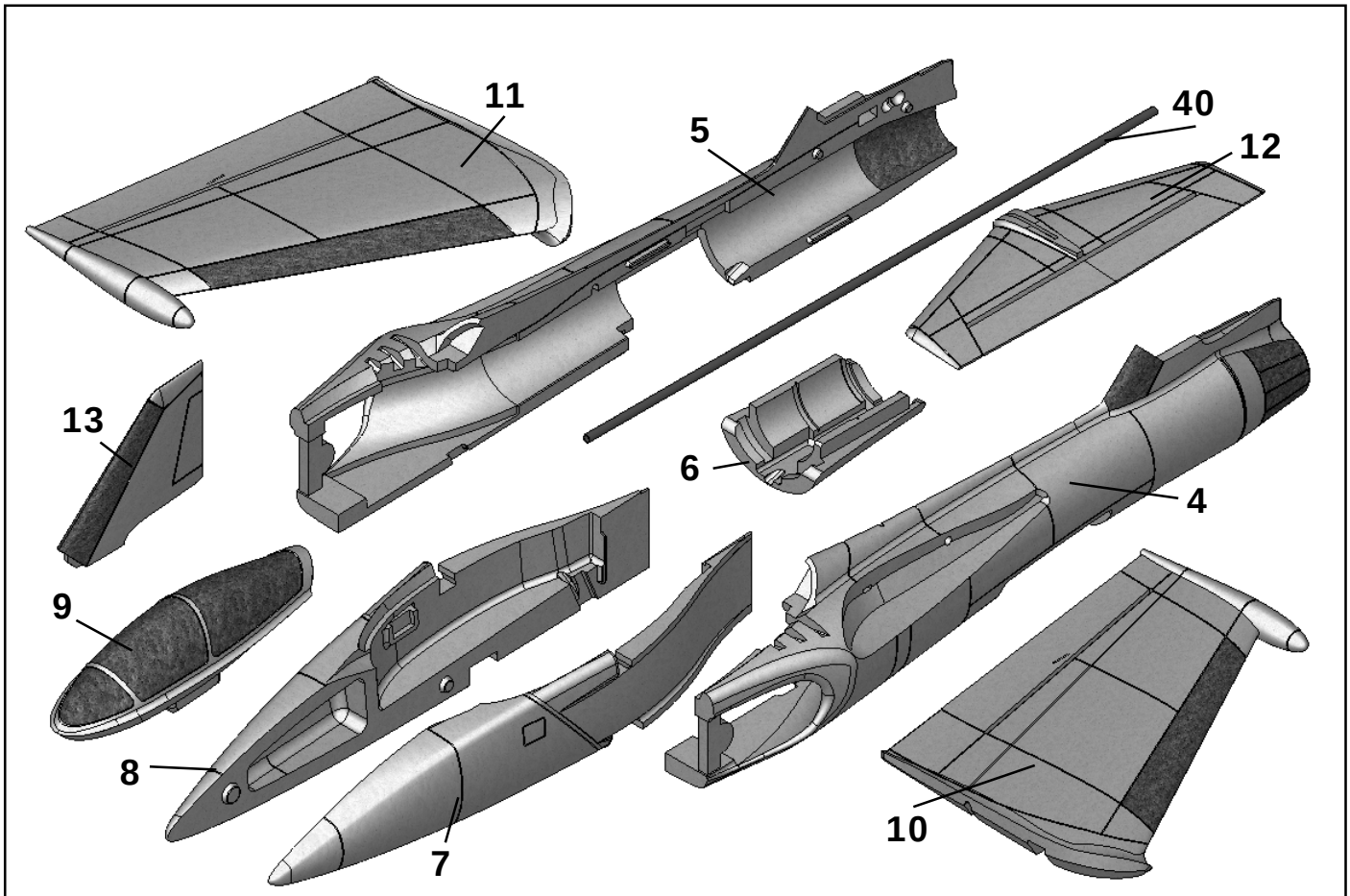

11
5
40
12
13
6
4
9
8
7
10

Abb. 01

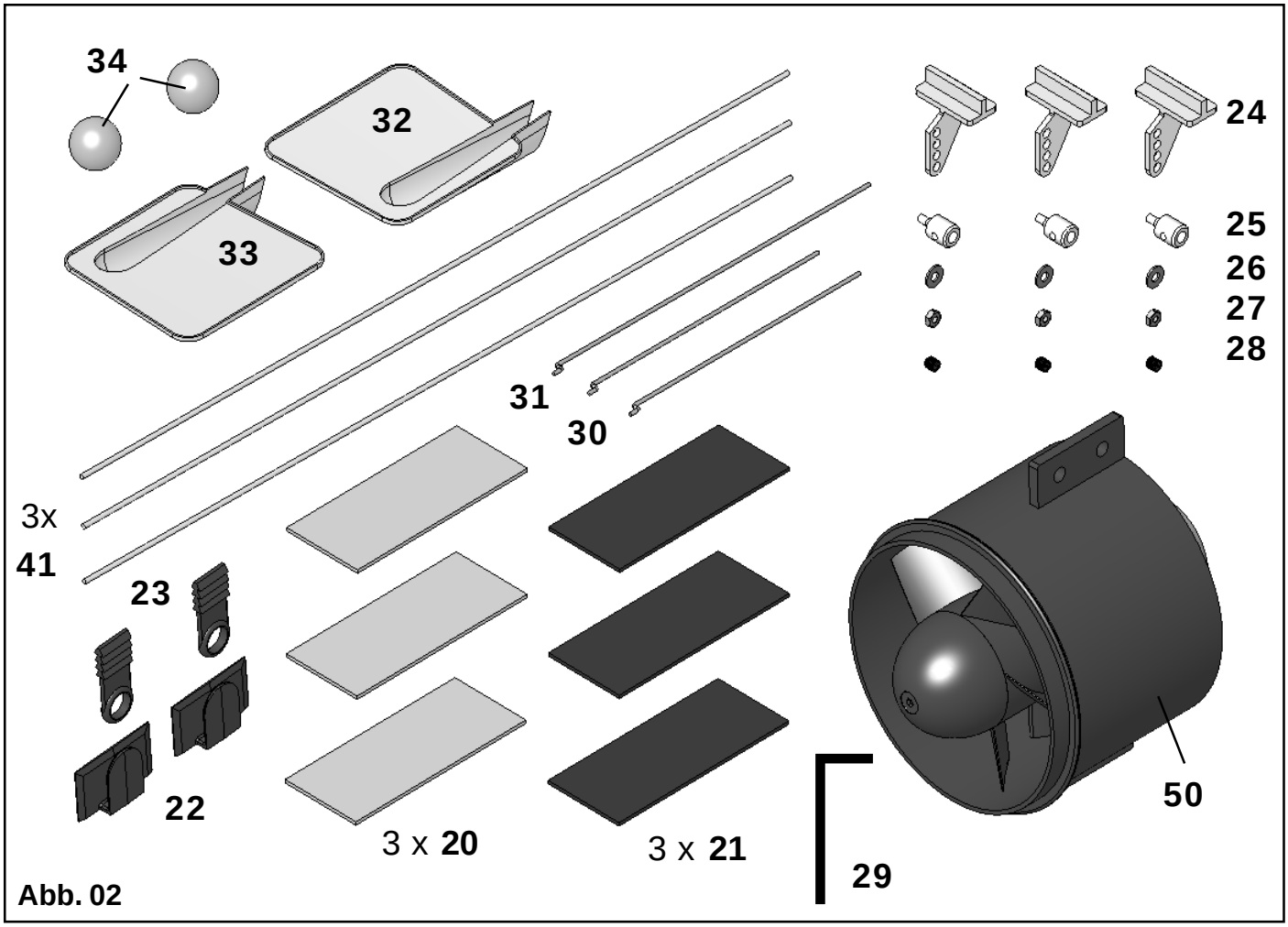

34
32
33
24
25
26
27
28
31
30
3x
41
23
22
3 x 20
3 x 21
50
29

Abb. 02

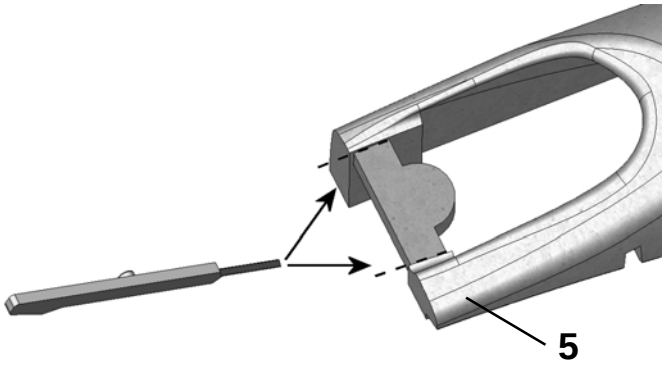


Abb. 03

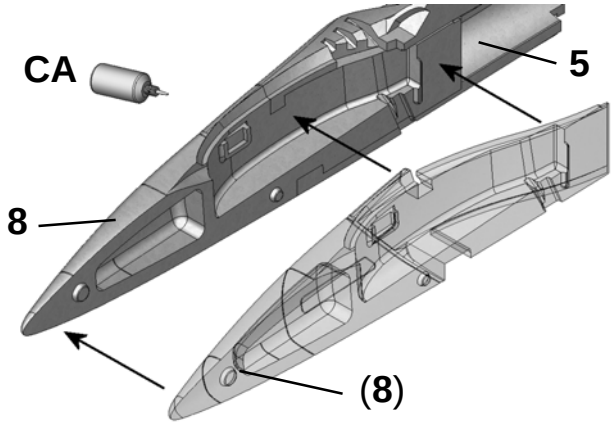


Abb. 04

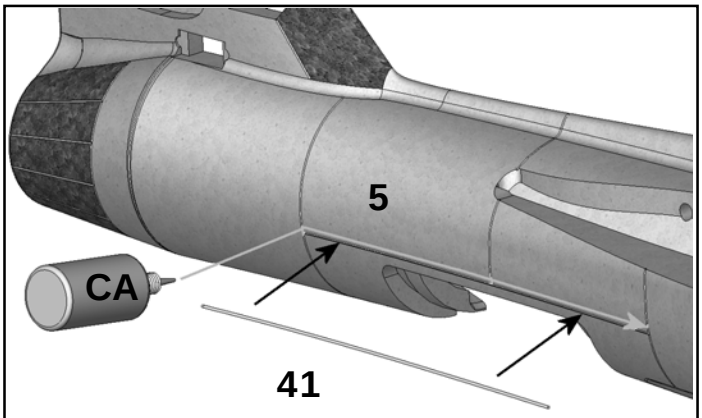


Abb. 05

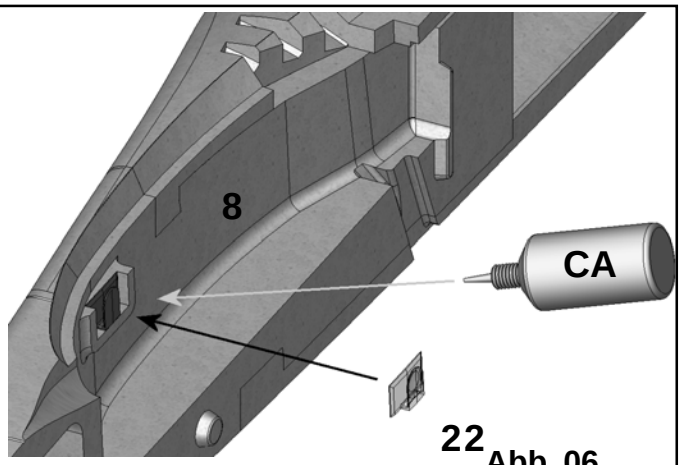


Abb. 06

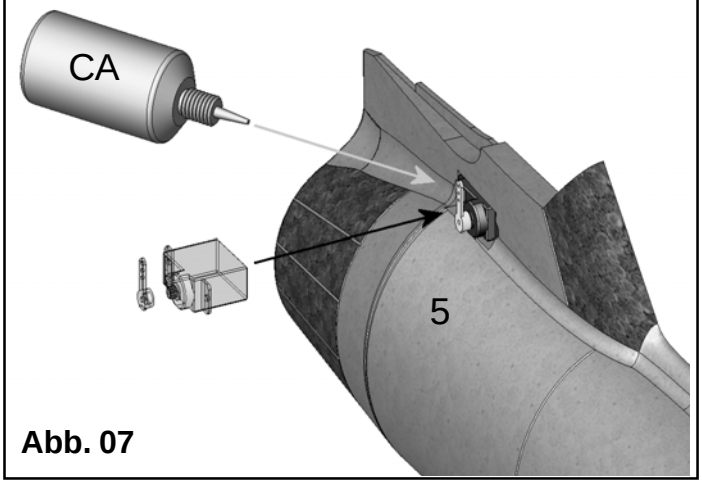


Abb. 07

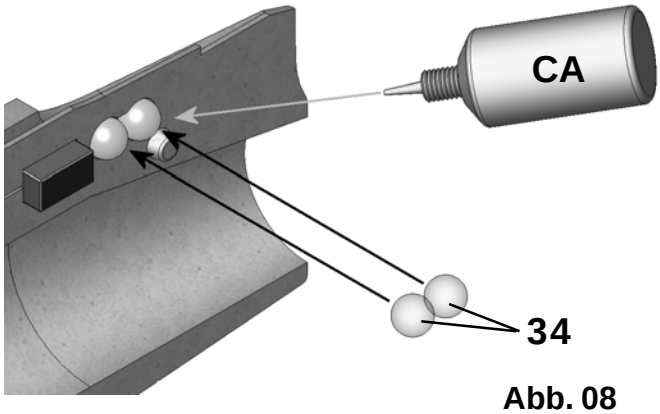


Abb. 08

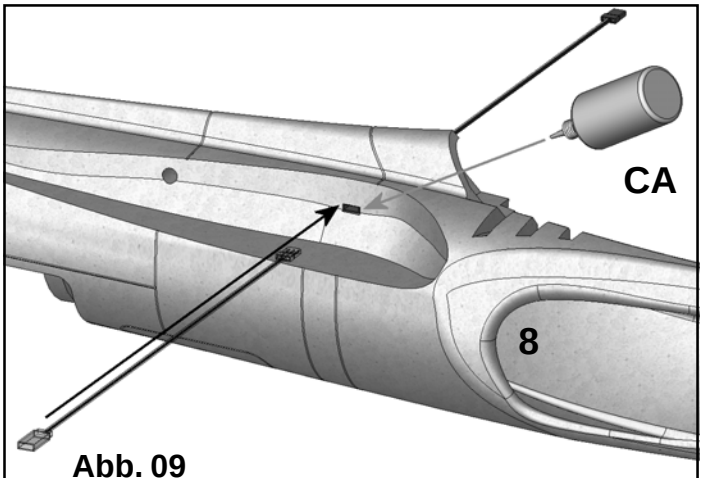


Abb. 09

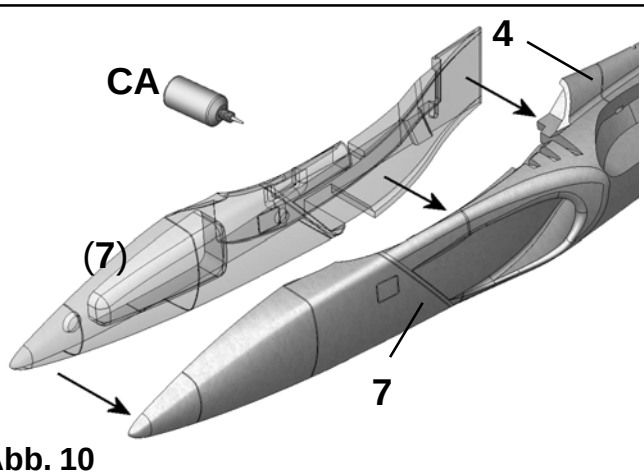


Abb. 10

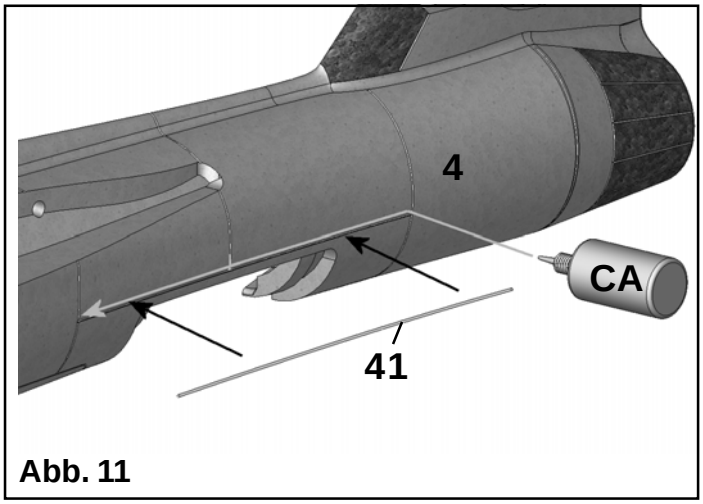


Abb. 11

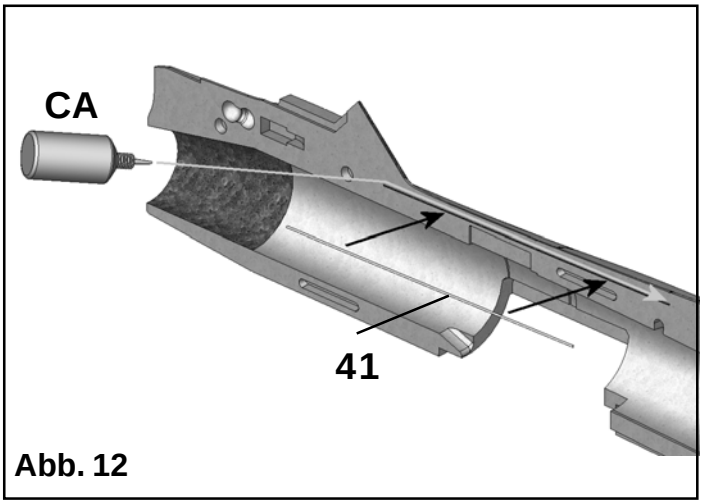


Abb. 12

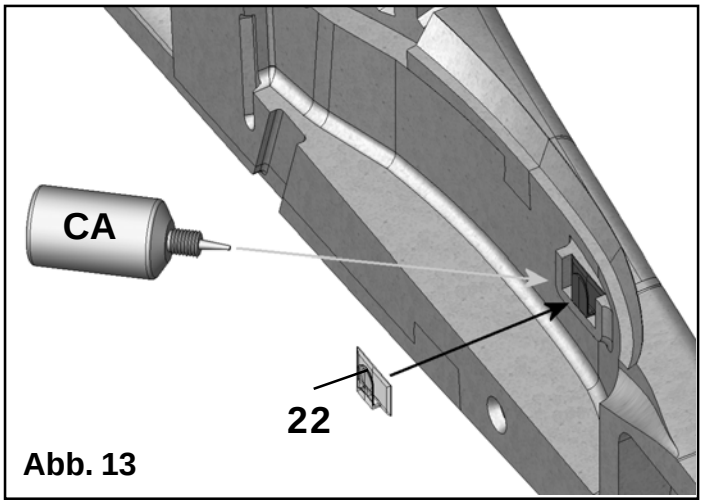


Abb. 13

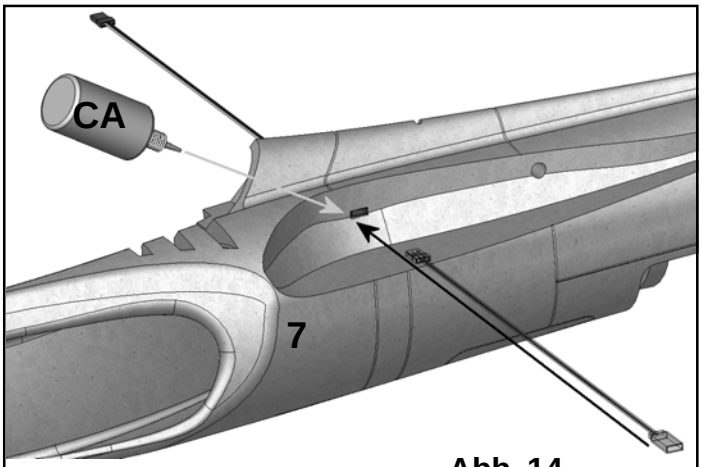


Abb. 14

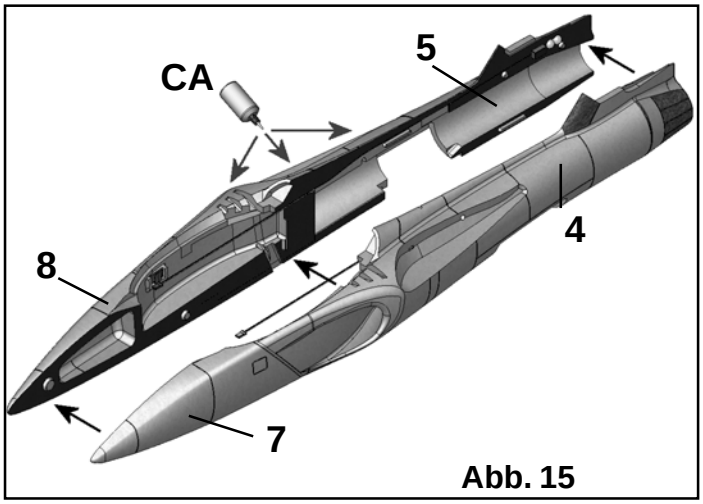


Abb. 15

Abb. 16

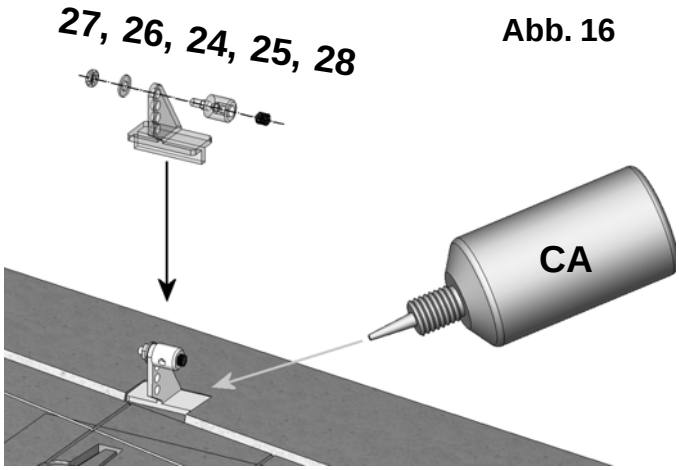
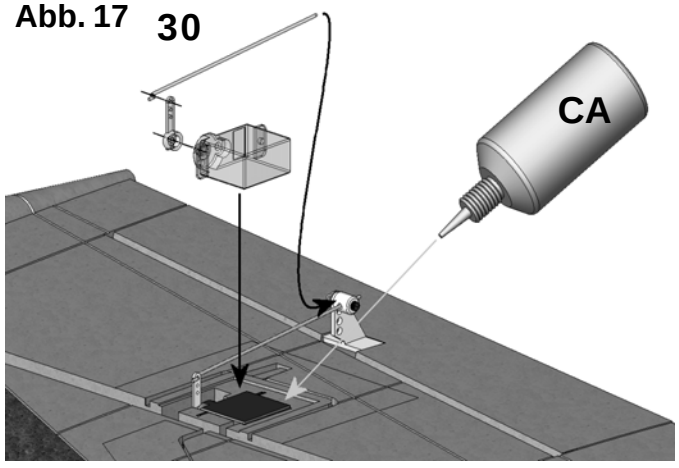


Abb. 17



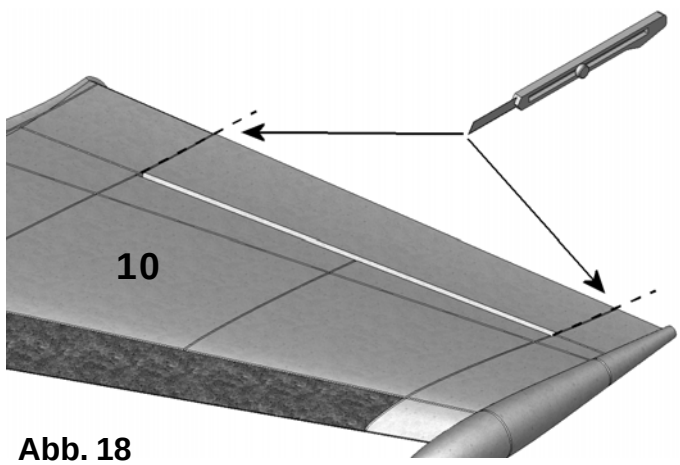


Abb. 18

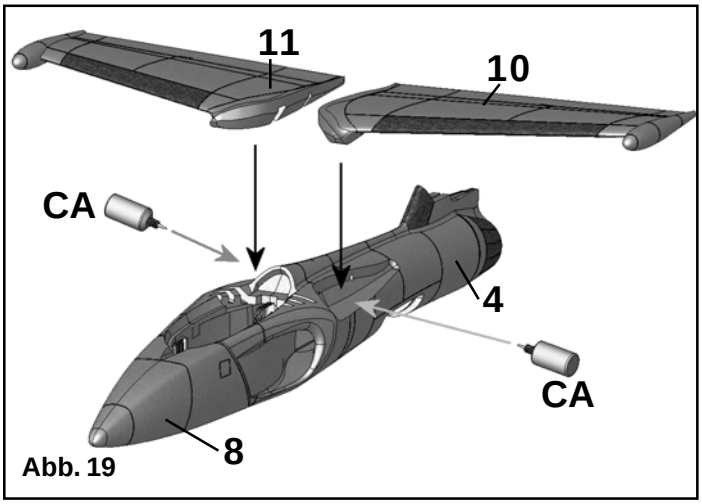


Abb. 19

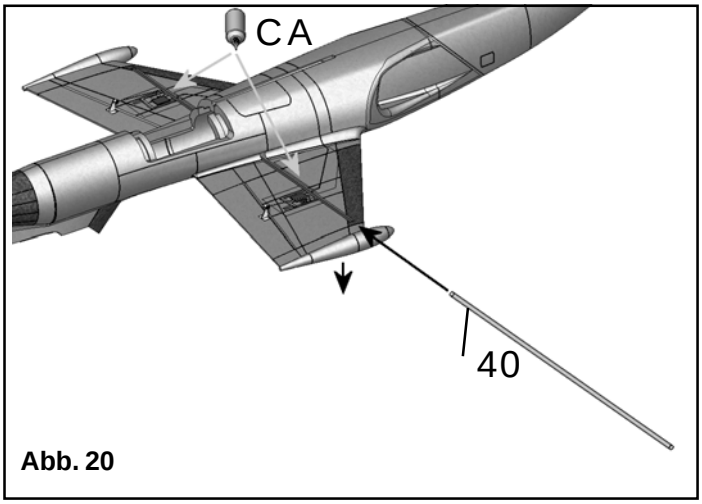


Abb. 20

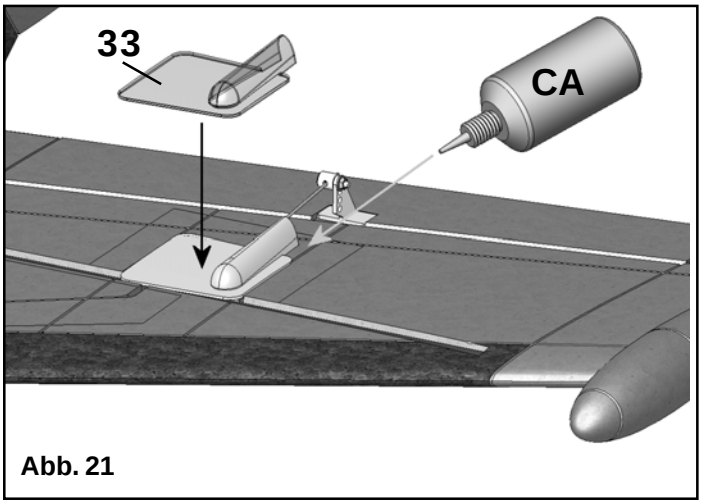


Abb. 21

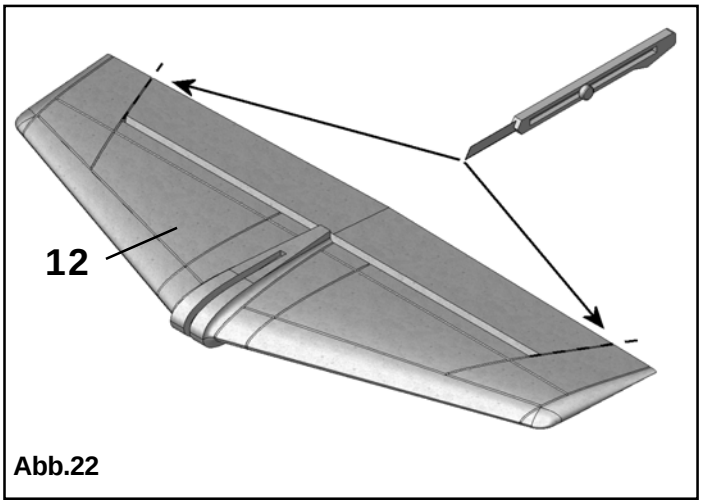


Abb.22

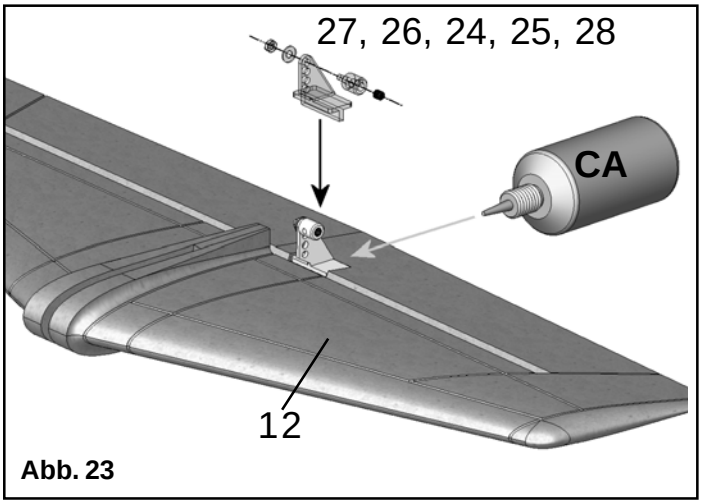


Abb. 23

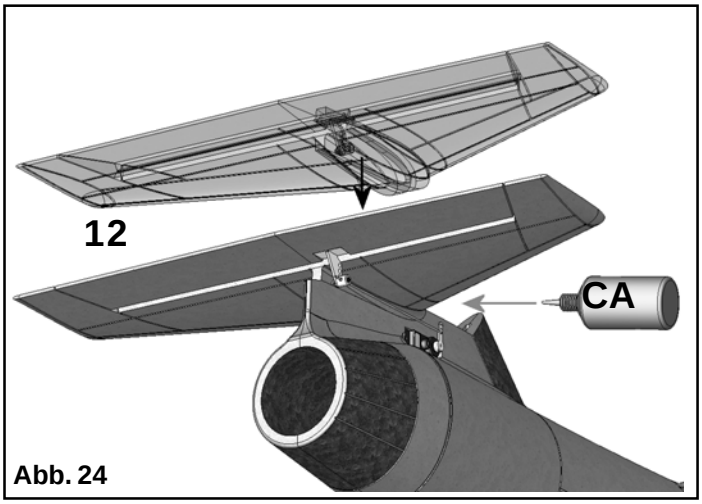


Abb. 24

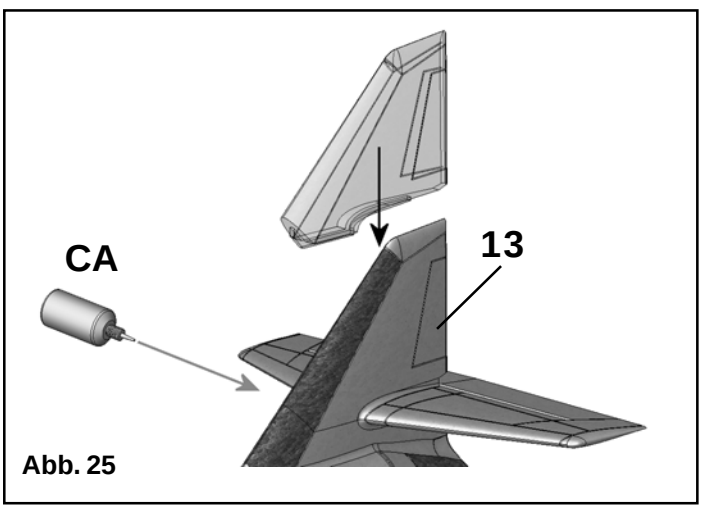


Abb. 25

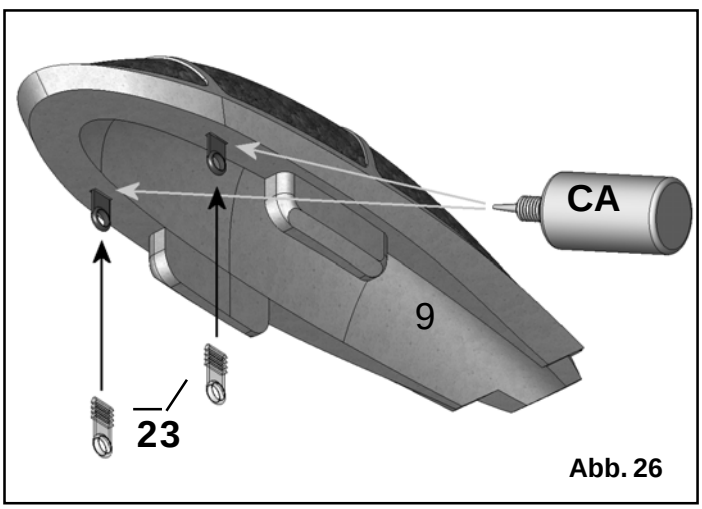


Abb. 26

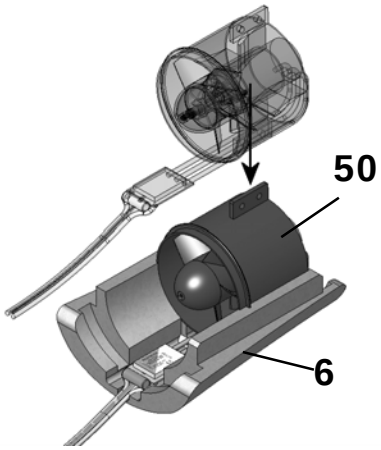


Abb. 27

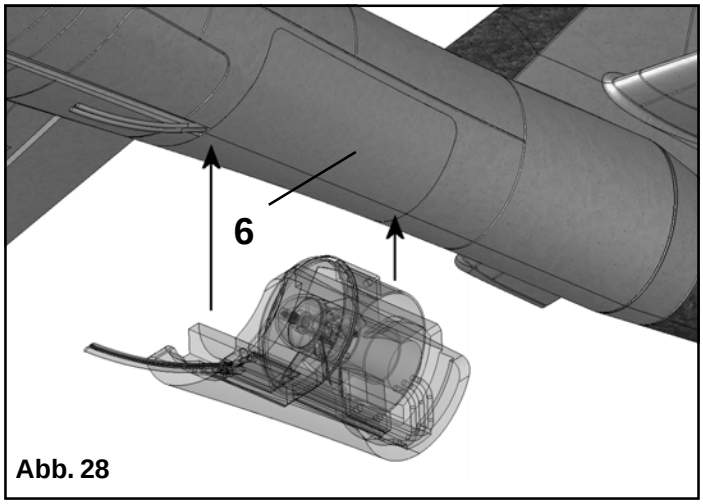


Abb. 28

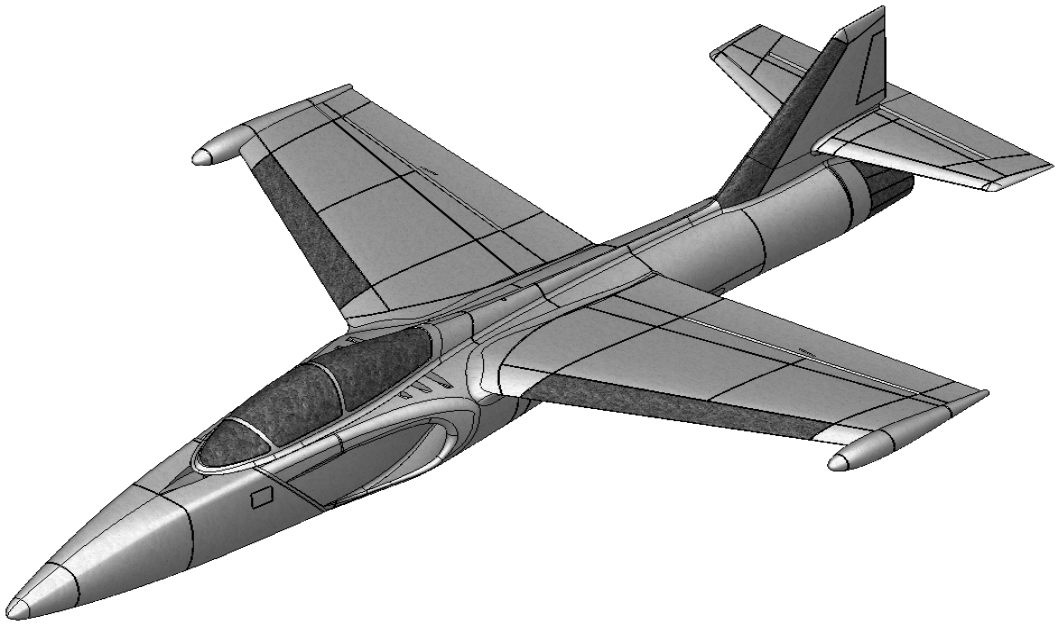


Abb. 29

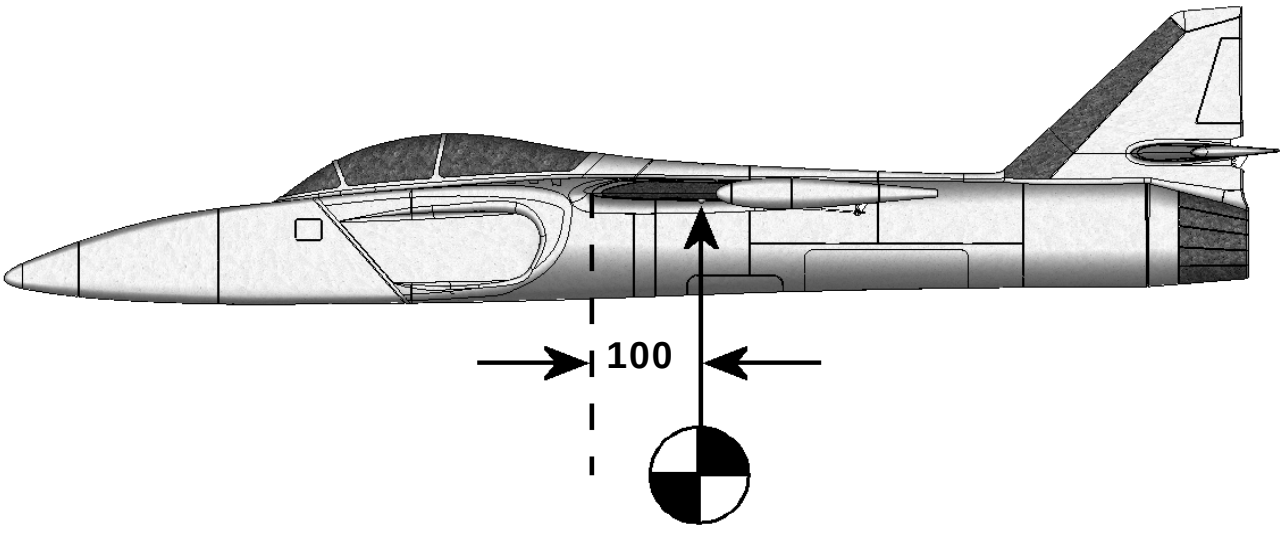
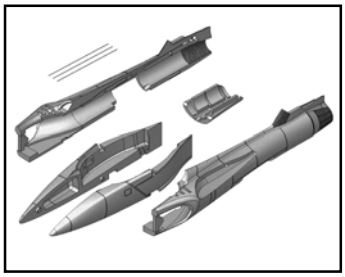


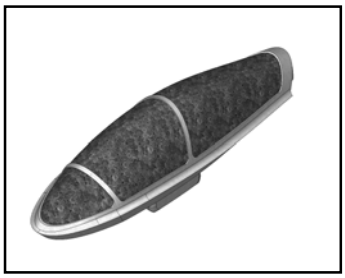
Abb. 30

ERSATZTEILE **(bitte bei Ihrem Fachhändler bestellen)**
REPLACEMENT PARTS **(please order from your model shop)**
PIECES DE RECHANGES **(S.V.P. à ne commander que chez votre revendeur)**
PARTI DI RICAMBIO **(da ordinare presso il rivenditore)**
REPUESTOS **(por favor, diríjase a su distribuidor)**

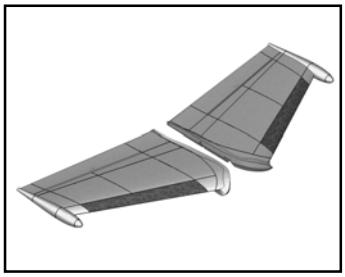
 # 22 4223
Rumpf mit Impellerabdeckung
Fuselage avec trappe de Turbine
Fuselage with Impeller hatch
Fusoliera con coperchio
Fuselaje con cubierta de propulsores



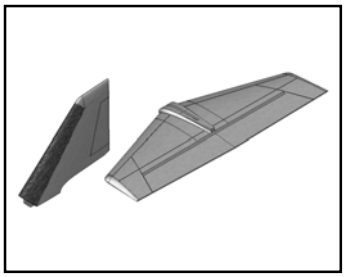
 # 22 4224
Kabinenhaube
Verriére
Canopy
Capottina
Cabina



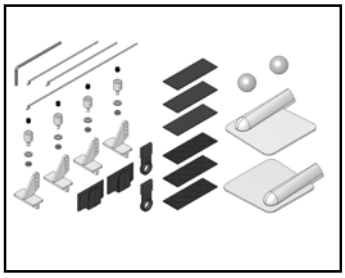
 # 22 4225
Tragflächen
Ailes
Wings
Ali
Alas



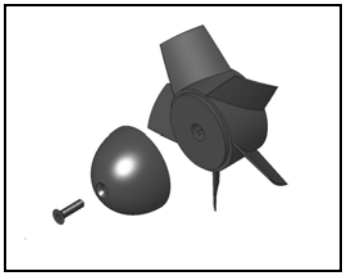
 # 22 4226
Leitwerkssatz
Empennage
Tail set
Kit piani di coda
Kit de empenaje



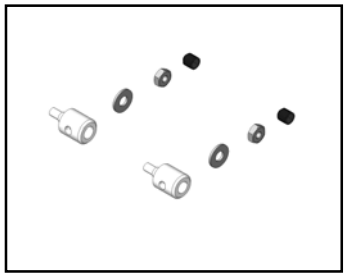
 # 22 4227
Kleinteilesatz
Set de petites piéces diverses
Small items set
Set minuteria
Pequeñas piezas



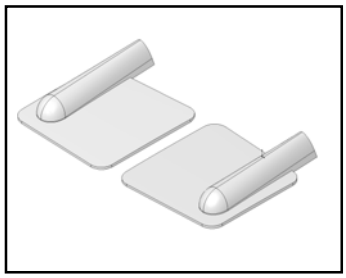
 # 33 2562
Rotor m. Spinner für DF69
Rotor avec cône pour turbine DF69
Rotor and spinner for DF69 impeller
Rotore con ogiva per DF 69
Rotor con cono para el propulsor DF69



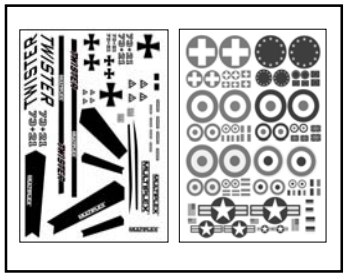
 # 70 3455
Gestängeanschluss 2 St.
Raccords de tringles 2x
Swivel pushrod connector 2x
Raccordo per rinvii 2 pz.
Retén de varilla 2 Uds.



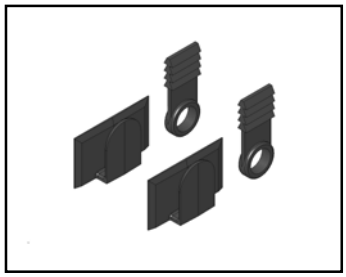
 # 72 4382
Servohutzen
Cache-servo (1 paire)
Servo fairing (pair)
Carenature per servi (1 coppia)
Encastres de servo (1 pareja)



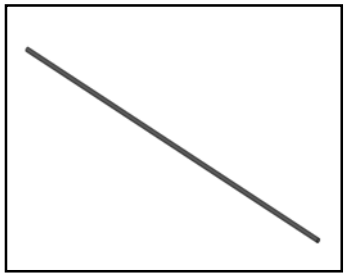
 # 72 4469
Dekorsatz 2-tlg.
Planche de décorration 2x
Decal set, two-part
Decals 2x
Lámina decorativa, 2 partes



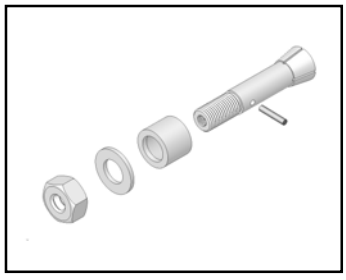
 # 72 5136
Canopy-Lock (2 Paar)
Canopy-Lock (2 paires)
Canopy Lock (2 pairs)
Canopy-Lock (2 coppie)
Cierre de cabina (2 pares)



 # 72 3128
Holmrohr
Clé d´aile
Tubular spar
Turbo baionetta
Larguero



 # 33 2563
Mitnehmer mit Zubehör DF 69
Plateau avec accessoires pour turbine DF 69
Driver with accessories for DF69 impeller
Mozzo e accessori per DF 69
Adaptador con accessorios para DF 69



This model only was possible with the contribution of

Won Ho Kang, idea
Klaus Michler, design, manual
Markus Weinsch, construction
Bernhard Dollrieß, data
Thomas Keck, test models
Roland Hock, artwork
an the Himax team, Impeller

Thanks to all for this beautiful model.